Coal Resource Management for Canadian Coalfields: Computer Modeling, GIS and the Internet

J. David Hughes, Geological Survey of Canada,
3303-33 st. N.W. Calgary, Alberta, T2L 2A7

ABSTRACT

Canada has extensive deposits of coal which are distributed from the Atlantic to the Pacific to the Arctic coasts. These deposits range in rank from lignite to anthracite, and occur in diverse geological settings. Coal mined from these deposits provides $2 billion in export revenue for Canada, and mine mouth electricity generation provides 19 per cent of the country's electricity. In addition, coalbed methane contained within deep coal deposits represents a potential energy resource that rivals Canada's conventional gas supplies in magnitude. Work is also underway through an International Consortium to investigate the potential of deep coal reservoirs for the sequestration of greenhouse gases.

Through its National Coal Inventory, the Geological Survey of Canada has, in conjunction with the provinces and the private sector, developed comprehensive computer databases of all available exploration data pertaining to these coal resources. Three-dimensional modeling technologies, developed through the National Coal Inventory, are utilized to create computer models of each coalfield which can be used to assess coal resources in terms of mining costs, quality, contained environmental contaminants, and surface land use in order to ensure availability of supplies while minimizing resource wastage and the environmental impacts of coal utilization. Regional- and detail-scale computer models have also been developed to determine the distribution of coalbed methane and greenhouse gas sequestration capacity as well as to locate optimal locations for exploratory test holes. Spatial data from the primary databases and the computer models are integrated within third-party Geographic Information Systems (GIS) for further query and analysis. The latest developments have allowed all information to be made available over the internet with full GIS functionality, allowing the user to query primary data, drill "virtual" boreholes to optimize future exploration, and obtain on-line property assessments of the economic and geological attributes of any subarea within a coalfield.